

## CLAIMS

1        1. An electrical contact of an optoelectronic semiconductor chip (1),  
2 comprising:

3              a mirror layer (2), comprised of a metal or a metal alloy adapted to be  
4 formed over the semiconductor chip;

5              a protective layer (3) over said mirror layer (2);

6              a layer sequence of a barrier layer (4) and a coupling layer (5) over said  
7 protective layer and a solder layer (8).

1        2. The electrical contact as claimed in claim 1, which includes a wetting layer  
2 (6) between the coupling layer (5) and the solder layer (8).

1        3. The electrical contact as claimed in claim 1, which is applied to a surface  
2 of a semiconductor chip (1) having a nitride compound semiconductor material.

1        4. The electrical contact as claimed in claim 1, in which the mirror layer (2)  
2 contains silver, aluminum or platinum.

1        5. The electrical contact as claimed in claim 1, in which the mirror layer (2) is  
2 between 70 nm and 130 nm thick.

1        6. The electrical contact as claimed in claim 1, in which a layer (13) of an  
2 electrically conductive material between 0.1 and 0.5 nm thin is included between the

3 semiconductor chip (1) and the mirror layer (2) to improve the adhesion of the mirror  
4 layer (2).

1           7. The electrical contact as claimed in claim 6, in which the surface of the  
2 semiconductor chip (1) has a nitride compound semiconductor material, the mirror layer  
3 (2) contains Al or Ag, and the thin layer (13) contains Pt, Pd or Ni.

1           8. The electrical contact as claimed in claim 1, in which the protective layer  
2 (3) contains titanium or platinum.

1           9. The electrical contact as claimed in claim 1, in which the protective layer  
2 (3) is between 5 nm and 15 nm thick.

1           10. The electrical contact as claimed in claim 1, in which the barrier layer (4)  
2 completely covers the mirror layer (2) and the protective layer (3).

1           11. The electrical contact as claimed in claim 1, in which the barrier layer (4)  
2 contains TiW(N).

1           12. The electrical contact as claimed in claim 1, in which the barrier layer (4) is  
2 between 300 nm and 500 nm thick.

1           13. The electrical contact as claimed in claim 1, in which the coupling layer (5)  
2 contains titanium.

1        14. The electrical contact as claimed in claim 1, in which the coupling layer (5)  
2 is between 30 nm and 70 nm thick.

1        15. The electrical contact as claimed in claim 2, in which the wetting layer (6)  
2 contains platinum.

1        16. The electrical contact as claimed in claim 2, in which the wetting layer (6)  
2 is between 70 nm and 130 nm thick.

1        17. The electrical contact as claimed in claim 2, in which a gold layer (7) is  
2 applied to the wetting layer (6).

1        18. The electrical contact as claimed in claim 1, in which a gold layer (9) is  
2 applied to the solder layer (8).

1        19. The electrical contact as claimed in claim 18, in which the gold layer (9)  
2 applied to the solder layer (8) is approximately 30 nm to 70 nm thick.

1        20. The electrical contact as claimed in claim 1, which is adapted for  
2 connection of the semiconductor chip (1) to a carrier body, the material of the solder  
3 layer (8) being suitable for forming an alloy with the material of the carrier body.

1        21. The electrical contact as claimed in claim 20, in which the solder layer (8)  
2 contains AuGe and the carrier body contains Ge.

1           22. The electrical contact as claimed in claim 20, in which the solder layer (8)  
2 contains AuSi and the carrier body contains Si.

1           23. The electrical contact as claimed in claim 6 which is adapted for  
2 connection of the semiconductor chip (1) to a carrier body, the material of the solder  
3 layer (8) being suitable for forming an alloy with the material of the carrier body, and  
4 wherein said thin layer (13) comprises palladium or a nickel oxide.

1           24. A method for producing an electrical contact of an optoelectronic  
2 semiconductor chip (1), comprising:

3                 providing a mirror layer (2), comprised of a metal or metal alloy, over the  
4 semiconductor chip;

5                 providing a protective layer (3) over said mirror layer;

6                 providing a layer sequence of a barrier layer and a coupling layer (5) over  
7 said protective layer; and

8                 providing a solder layer (8) over said layer sequence.

1           25. A method for producing an electrical contact as claimed in claim 24, in  
2 which the contact is patterned by means of a lift-off technique.

1           26. The method as claimed in claim 25, in which a mask layer (10) applied to  
2 the semiconductor chip (1) for the lift-off technique is provided with an undercut, the  
3 mirror layer (2) is vapor-deposited in a directed manner and the barrier layer (4) is

4 applied by an undirected, covering coating method in such a way that the barrier layer  
5 (4) completely covers the layers lying under it.

1 27. A method for producing an electrical contact as claimed in claim 24,  
2 wherein a layer (13) of an electrically conductive material between 0.1 and 0.5 nm thin  
3 is applied to the semiconductor chip (1) before the application of the mirror layer (2) to  
4 improve the adhesion of the mirror layer (2).

1 28. The method as claimed in claim 27, wherein the surface of the  
2 semiconductor chip (1) has a nitride compound semiconductor material, the mirror layer  
3 (2) contains Al or Ag, and the thin layer (13) contains Pt, Pd or Ni.

1 29. The method as claimed in claim 24, wherein said mirror layer is comprised  
2 of silver, and the method further comprising annealing at approximately 300°C to  
3 improve adhesion of said mirror layer to the semiconductor chip.

1 30. The method as claim in claim 24, wherein providing said layer sequence  
2 comprises providing said barrier layer over said protective layer, and providing said  
3 coupling layer over said barrier layer.

1 31. The electrical contact as claimed in claim 1, wherein said layer sequence  
2 comprises said barrier layer over said protective layer, and said coupling layer over said  
3 barrier layer.

1           32. The electrical contact as claimed in claim 20, wherein said alloy is a  
2 eutectic alloy.